



# HARDWOOD PLYWOOD

The HPI trademark on hardwood plywood identifies mills that operate under a rigid 5-point quality control program. It's your assurance of quality, dependability and service.

## Enduring Natural Beauty

Frank Lloyd Wright, an eminent architect, when speaking of plywood once said, "the machine has emancipated the beauty of wood"

## Easy to Apply and Finish

Easily machined shaped and formed and quickly installed with several simple optional methods including, mastics, contact cement, nails, screws or clips.

## Economical

Treasures of the forests of the world in sturdy economical panel form. Moderate "in-place" cost, and low maintenance makes for greatest economy.

## Many Uses

Unsurpassed beauty plus functional strength, rigidity, impact and wear resistance make hardwood plywood a favored material of many uses.

## Availability

Stock panels available from warehouse distributors in every area. Special architectural and millwork items on reasonable production schedules commensurate with quality.



## UNLIMITED DESIGN OPPORTUNITY

The epitome of design and function is illustrated by a scale model of the Saarinen arch (built of plywood at the Museum of Science & Industry, Chicago, Illinois). It is an excellent example of hardwood plywood's truly flexible, workable characteristics. Plywood lends itself to intricate interpretation of mood or structural function adding distinctive beauty symmetrically matched through the miracle of plywood assembly. Six wood species blend together in lovely natural wood hues from dark brown to cream tones to lusty russet.

## Hardwood Plywood Institute

600 S. Michigan Ave. • Chicago 5, Ill.



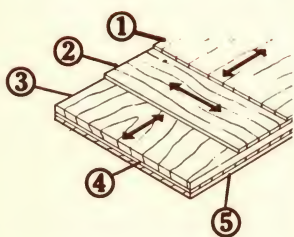


# HELPFUL ARCHITECT AND SPECIFIER USE-GUIDE

Hardwood plywoods are available in many species and figure types, but the basic quality standards are relatively simple as included in the new Commercial Standard CS35-56. Listed here are excerpts from the Standard plus other basic information which will be helpful to specifiers and users. Supplemental data including detailed finishing practices, a 24 page 4-color handbook, technical data, a 20" x 30" 4-color wall chart (20c) classifying woods by figure and price group, and "A Treasury of Hardwood Plywood" (25c) are available on request to the Hardwood Plywood Institute office, or from your local supplier.

Species charts and display samples make selection of wood species and figures relatively easy, and a few simple rules assist in establishing the three basic specification criteria of (1) construction (either veneer or lumber core); (2) type of bond or adhesive (see below), and (3) grade of face or faces if both sides are exposed (see page 4).

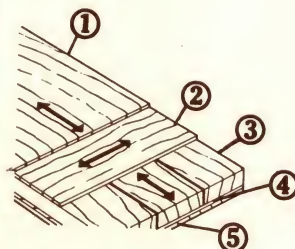
## Plywood Construction



**Veneer Core Construction** is preferred for Type I plywood, for bending and molding, exterior purposes or where subjected to moisture. The number of plies required depends on how panel will be used . . . as a general rule the more plies, the more stable the panel will be and the more uniform its strength over larger areas.

**Veneer Core Construction**  
(5 ply panel)

1. face veneer
2. crossband
3. veneer core
4. crossband
5. face or back veneer



**Lumber Core Construction** is generally used for fine architectural treatments, for furniture, built-ins, fixtures and when edge treatment of wood is desired, or where butt hinges are to be used. Core is made of narrow solid wood strips (arranged to equalize stress) and edge-glued together. Available on order with face wood banded on sides and ends.

**Lumber Core Construction**  
(5 ply panel)

1. face veneer
2. crossband
3. lumber core
4. crossband
5. face or back veneer

## Quality Tested Bond For Every Use

Hardwood plywood permanently bonded with modern adhesives provides a panel which, for all practical purposes, is just as "solid" as lumber. In fact, the bond formed by today's adhesives is actually stronger than the wood itself. (excerpts from C535-56)

**Type I—fully waterproof bond.**—The bond shall withstand full weather exposure and shall be unaffected by microorganisms. The bond shall be of such quality that specimens will withstand the dry shear and cyclic boil tests described in paragraphs 5.4.1 and 5.4.2.

**Type II—water resistant bond.**—The bond shall retain practically all of its strength when occasionally subjected to a thorough wetting and drying. The bond shall be of such quality that specimens shall withstand an average of 10 cycles when subjected to the 15 cycle cold soak test as described in paragraph 5.5.

**Type III—moisture resistant bond.**—The bond shall retain practically all of its strength when occasionally subjected to moisture. The bond shall be of such quality that specimens will withstand the cold soak 2-cycle test described in paragraph 5.6.

## Important Physical Properties

**HARDWOOD PLYWOOD IS STRONG**—Hardwood plywood has tremendous strength, not only lengthwise but across the grain which makes it ideally suited for use in large areas. It has been proven by actual test that pound for pound hardwood plywood is stronger than steel.

**HARDWOOD PLYWOOD HAS GREAT DIMENSIONAL STABILITY**—Because the adjacent layers of veneer in hardwood plywood run at right angles to each other, the tendency of any individual ply to shrink or expand is severely restricted, hence the panel is highly stable. Moisture content is practically uniform throughout the entire panel and possible distortion is reduced to a minimum.

**HARDWOOD PLYWOOD RESISTS IMPACT—WILL NOT SPLIT**—Hardwood plywood can take an amazing amount of abuse without damage. The impact of any blow is dissipated throughout the entire area of a panel. Nails, screws and other fastenings can be placed near the edge without danger of splitting.

**HARDWOOD PLYWOOD IS SMOOTH**—The inherent properties of hardwoods, and freedom from grain-raise, assure smooth surfaces. Because of the wide selection of densities offered by the various species, it is possible to tailor a panel to suit any particular surface requirement. If abrasion resistance is necessary, a high density wood is used for the surface layer. If only smoothness is required, a medium or low density veneer may be adequate.

**HARDWOOD PLYWOOD IS EASY TO USE—SAVES TIME**—A hardwood plywood panel can be easily and smoothly machined with ordinary wood-working tools. Uniformity of texture and freedom from chipping and breaking make it a preferred material for cabinet or built-in construction. Thin panels can often do the work of thicker more expensive components, making the article lighter and easier to handle. The large size panels cover large areas quickly.

**HARDWOOD PLYWOOD CAN BE BENT FOR CURVED SURFACES**—Some hardwood plywood producers make simple and compound curved plywood for specialized uses. (For abrupt curvatures, kerfing of the back to reduce compression makes it possible to bend to even shorter radii.)

	Radii for bending in dry condition	Thick- ness	Length- wise of panel	Cross- wise of panel
Birch	(Poplar core)	1/8"	13.3"	8.3"
		1/4"	28.0"	20.9"
		3/8"	39.6"	34.4"
Mahogany	(Poplar core crossband)	1/8"	10.2"	8.3"
		1/4"	21.5"	20.9"
		3/8"	30.3"	34.4"

**ACOUSTICAL PROPERTIES**—Many of the finest auditoriums use stage areas, baffles and splayed walls of plywood. Back walls are frequently perforated to allow sound to pass through to more absorbent cores avoiding sound distortions. Technical and case study data available.

**FIRE RESISTANCE**—Special fire retardant panels with treated cores are available on special order. However, for most uses, standard construction panels are adequate. Type I (waterproof) panels maintain their bond under heat and will generally contain fires within limited areas.

## Plywood Dimensions

Panels are available in widths from 24" to 48" in 6" multiples, and in length from 36" to 96" in 12" multiples. Wider panels and lengths of 10' and 12' are available from many distribution warehouses. Economies can be achieved by designing to use shorter and narrower panels. Many mills supply panels cut-to-size for special volume uses. "Counter front" panels have grain running the short way of the panel; they are produced in widths of 72, 84, 96, 120 and 144 inches (up to 192" on order) and in lengths of 24, 28, 30, 36, 42 and 48 inches. "Scarfing" joins long lengths for exterior and marine use.



# BEAUTY IS THE HALLMARK OF HPI LABELED PLYWOODS

## Hardwood Species

Finest woods from all over the world are obtained for plywood manufacture. Some are commercially available in a dozen distinct figure types to suit the most discriminating buyer. In certain instances, fiber strength for bending or wear resistant properties are important for efficient design.

Special architectural flitches (veneers from the same tree) are available for selection by the client. Warehouse stocks are maintained by many mills of from twenty to fifty different species and figure types. Stock panels are also available in most commercial woods. Consult local suppliers who can provide selection charts and samples.

## Color Selection

The natural color spectrum of hardwoods enables the designer and craftsman to achieve a wealth of tones and color effects, even without the use of special stains or finishes. Hardwood plywoods range in natural color from creamy whites, straw tones and pale lemon yellows to rich russets and black-browns . . . even include exotic pinks, grays, yellows, tans, oranges, reds, greens and purples. These distinctive natural hues are enriched by a wide variety of wood figures and grain patterns that give a satiny luster and texture found only in genuine wood. Because hardwood plywood takes finishes so well, an infinite variety of additional color effects can be obtained by using tints, stains or fillers.

## Hardwood Plywood Meets Building Codes

(FHA and PHA permit use of hardwood plywood for home construction if MPR's are met. Check local codes too.)

**For Interior Finish.** Generally, specify Type II. Minimum thickness  $\frac{1}{4}$ " for studs 16" oc. If  $\frac{3}{8}$ " hardwood plywood, stud spaces may be 24" oc. Use Type I in bathroom facilities where permitted. Consult FHA MPR's for thickness of hardwood plywood sheathing for various purposes.

**For Exterior Use.** Must be waterproof (Type I). Minimum  $\frac{3}{8}$ " thickness recommended when applied to studding on 16" centers. Over ordinary sheathing  $\frac{1}{4}$ " thick panels are acceptable and are generally used for breezeways, porches, etc., also for walls and ceilings. Use  $\frac{3}{8}$ " Type I hardwood plywood for smooth painting soffits.

**For Cabinet and Storage Wall Construction.** Usually  $\frac{3}{4}$ " thick panels are recommended for cabinet doors up to 48" long.  $\frac{5}{8}$ " and  $\frac{1}{2}$ " panels are sometimes used for smaller doors. When edges are exposed, lumber core hardwood plywood is generally preferred. For longer cabinet doors, wardrobe construction, storage walls, etc., thicker panels in solid or hollow core construction are available.

## Plywood Thicknesses

Veneer core construction panels in 3, 5, 7 and 9 ply are generally available in the following thicknesses:

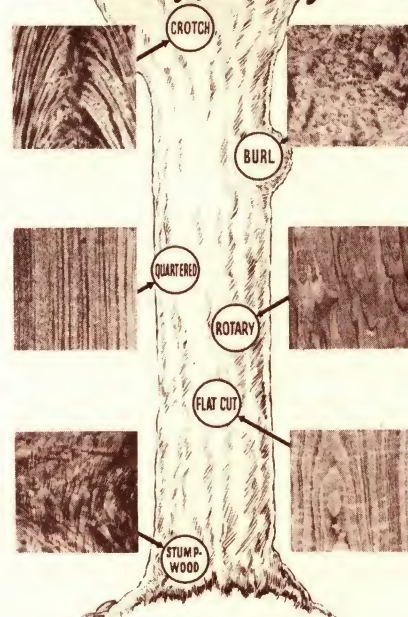
- 3 ply— $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$  inch
- 5 ply— $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  inch
- 5 and 7 ply— $\frac{5}{8}$  inch
- 7 and 9 ply— $\frac{3}{4}$  inch

Unless otherwise stated, all hardwood plywood panels are sanded both sides with tolerance plus "0" or minus  $\frac{1}{32}$ " and trimmed to specified size plus or minus  $\frac{1}{32}$ ".

Commercial standard hardwood plywood shall be square within  $\frac{1}{16}$ " measured on short dimension.

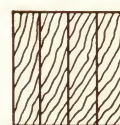
## Veneer Grain and Figure Patterns

*Where veneer figures are found!*

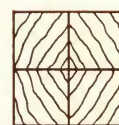


The various wood grain and figure patterns of face veneers used in hardwood plywood are determined by three main factors: 1) the part of the tree from which the veneer is cut; 2) the method of cutting (Quartered sliced veneer for example, shows a stripe produced by cutting across growth rings. In flat cut—or half round veneers the pattern is determined by the angle at which the knife passes through the growth rings. Rotary cut veneer, on the other hand, shows a highly figured and irregular pattern also occasioned by the angle at which the knife cuts through the growth rings); 3) the species of tree. From some species many figure types are cut. From most species however, production is limited to one or two figure or grain types.

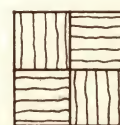
## Special Matching Effects



SLIP MATCHING



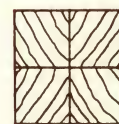
DIAMOND MATCHING



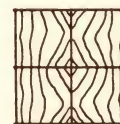
CHECKERBOARD MATCHING



BOOK MATCHING



REVERSE DIAMOND



4-WAY CENTER AND BUTT

Veneer-matching achieves striking architectural effects. Slip-matching joins adjacent veneer sheets side-by-side; grain faces in same direction to avoid sharp contrasts (preferred for rifts and quartered cuts). Book-matching opens up adjacent veneer sheets from a flitch like a book, so pattern is repeated in reverse.



# GRADE STANDARDS FOR HARDWOOD PLYWOOD

(Excerpts from Commercial Standard CS35-56)

These are the basic grade standards for veneers in plywood manufacture. Details of allowable characteristics of individual species are shown in CS35-56. Photographs show typical characteristics of Birch plywood of various grades. Variations between grades of other woods are approximately the same.

## CUSTOM GRADE—

This grade includes special selections and types produced by individual mills, or panels of a grade description agreed upon by buyer and seller. Architectural plywoods, technical types and matched grain panels for special uses also are included.

## GOOD GRADE (1)—

(For natural finish)—The face shall be made up of tight, smoothly cut veneer, containing the natural character markings inherent in the species. If made of more than one piece, it shall be matched at the joints to avoid sharp contrasts in color and grain. A few small burls, occasional pin knots, slight color streaks or spots and inconspicuous small patches, shall be permitted. Knots (other than pin knots), worm holes, splits, shake, doze and other forms of decay shall not be permitted.

## SOUND GRADE (2)—

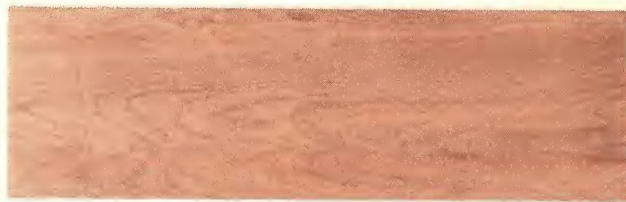
(For smooth paint surfaces)—The face shall be free from open defects to provide a sound, smooth surface. The veneer is not matched for grain or color. It may contain mineral streaks, stain, discoloration, patches, sapwood, sound tight knots up to  $\frac{3}{4}$ " in average diameter, sound smooth burls up to 1" in average diameter. Rough cut veneer, brashness, splits, shake, doze or other forms of decay are not permitted.

## UTILITY GRADE (3)—

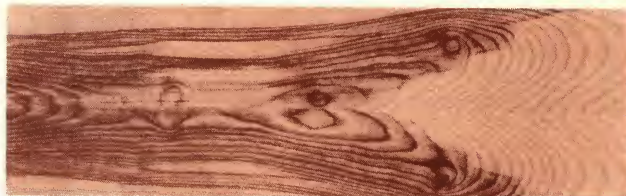
Discolorations, stain, mineral streaks, patches, tight knots, tight burls, knot holes up to  $\frac{3}{4}$ " in average diameter, worm holes, splits or open joints not exceeding  $\frac{3}{16}$ " and not extending half the length of the panel, cross breaks to a length not greater than that of the permissible knot holes, and small areas of rough grain shall be admitted. Brashness, shake, doze, or other forms of decay are not permitted.

## BACKING GRADE (4)—

The veneer may be unselected for grain or color. Knot holes no greater than 2" in maximum diameter and no group of knot holes in any 12" square exceeding 4" in diameter and splits no wider than 1" shall be admitted. Splits 1" wide at widest point may be one-fourth panel length; those not more than  $\frac{1}{2}$ " wide at widest point may be one-half panel length, those not more than  $\frac{1}{4}$ " wide may be full panel length. Mineral streaks, stain and discolorations not associated with rot or doze, shims, plugs, patches, knots, burls, worm or borer holes and other characteristics are permitted, provided they do not seriously impair the strength or serviceability of the panel into which the veneer is incorporated.



CUSTOM GRADE



GOOD GRADE



SOUND GRADE

## Hardwood Plywood Easy to Finish

Since hardwood plywood is genuine wood made into sturdy panel form, the standard finishing treatments for wood are practical. Experienced master painters and leading paint manufacturers endorse the following three step finishing process (Detailed suggestions on installing and finishing hardwood plywood are available from the Institute's office.):

Step 1. Sand plywood surface with 6/0 or 7/0 paper.

Step 2. Seal wood pores with thinned sealer or  $\frac{1}{2}$  shellac- $\frac{3}{4}$  thinner before applying stain or toner. "Open pore" species such as oak, elm, mahogany, walnut, ash, luan and prima vera are often paste filled for smooth surface.

Step 3. Apply two top finish coats of varnish, lacquer or wax of desired gloss.

NOTE: If color tone or stain is to be added apply after thin coat of sealer.

## Sample Specifications

(State width dimension first, then length, following direction of grain.)

45 pieces, 36" x 72" x  $\frac{3}{4}$ ", 5 ply, lumber core, natural birch plywood, HPI Good one side, Sound back. Type II (urea resin glue).

90 pieces, 24" x 24" x  $\frac{3}{8}$ ", 5 ply, veneer core, select red gum plywood, HPI Good one side, Utility back. Type II (urea resin glue).

NOTE—If special sequence matching is desired include details and blue prints.

(Leading retail lumber dealers carry a limited supply of hardwood plywood in stock. They are able to fill-in special thicknesses and sizes from nearby warehouse supplies. For large requirements and special sizes, place orders 60 to 90 days in advance to allow time for "quality controlled" production.)

## Check List

Does your specification order show:

- ☐ Number of pieces
- ☐ Sanded or unsanded (specify)
- ☐ Width, length and thickness (finished)
- ☐ Number of plies
- ☐ Core construction (lumber or veneer)
- ☐ Species of wood
- ☐ Grade of face
- ☐ Grade of back
- ☐ Type (adhesive requirement)

(Also detail any special requirements for matching, color selection, or veneer thickness. Plywood suppliers can often suggest economies in achieving special effects.)



## HPI MEMBER MILLS

**ALGOMA PLYWOOD & VENEER CO.**  
Algoma, Wis.—Hunter 7-5551  
(Subsidiary of U.S. Plywood Corp.,  
Home office: 55 W. 44th St., New York City)

**ATLAS PLYWOOD CORP.**  
20 Providence St., Boston, Mass.  
—Phone: Hancock 6-0016  
(Plants: Newport, Vt., Greenville, Me.,  
Goldsboro, N.C., Gladstone, Mich.,  
Plymouth, N.C., Center, Tex.)

**BRADLEY PLYWOOD CORP.**  
Savannah, Ga.

**CALYPSO VENEER CO., INC.**  
Calypso, N.C.—Phone: 2542 or 2935

**COMMONWEALTH PLYWOOD CO., LTD.**

Ste. Therese, P. Q., Canada  
Montreal, University 6-7934

**DARLINGTON VENEER CO.**  
Darlington, S.C.—Phone: 445

**DULANEY PLYWOOD CORP.**  
(Toll City Division)  
300 W. Main St., Louisville, Ky.

**F. EGGERS PLYWOOD & VENEER CO.**  
Two Rivers, Wis.—Phone: 378

**FERNWOOD INDUSTRIES**  
Fernwood, Miss.  
—Phone: McComb 342

**THE FYLES CO.**  
Orwell, Vt.—Phone: Shoreham 27R12

**GEORGIA-PACIFIC PLYWOOD CO.**  
P. O. Box 1350, Savannah, Ga.  
—Phone: Adams 4-8858

**INTERNATIONAL PANEL BOARDS LIMITED**

Gatineau, P.Q., Canada—Phone:  
Ottawa MONTCAIM 3-5331

**JASPER WOOD PRODUCTS CO., INC.**  
Jasper, Ind.—Phone: 132

**LARSON PLYWOOD CO.**  
Sheboygan, Wis.—Phone:  
Glencourt 7-5081

**LINWOOD, INC.**  
Gillett, Wis.—Phone: 184

**LULLABY FURNITURE CORP.**  
Stevens Point, Wisc.

**MCKNIGHT VENEER AND PLYWOODS, INC.**

P.O. Box 415, Helena, Ark.  
—Phone: Justice 5-2501

**MEMPHIS PLYWOOD CORP.**  
Memphis, Tenn.  
—Phone: Whitehall 8-5531

**NICKEY BROTHERS, INC.**  
2700 Summer Avenue, Memphis,  
Tenn.—Phone: 34-8831

**PERRY COUNTY PLYWOOD CORP.**  
P.O. Box 158, Beaumont, Miss.  
—Phone: Sterling 4-2121

**PICAYUNE VENEER & PLYWOOD COMPANY**  
Picayune, Miss.—Phone: 1115

**THE PLYWOOD CO.**  
Box 151, Sumter, S.C.  
—Phone: Spruce 3-9341

**ALLEN QUIMBY VENEER CO.**  
Bingham, Me.

**RODDIS PLYWOOD CORP.**  
Marshfield, Wis.—Phone: 1200

**SETTER BROS., INC.**  
Cattaraugus, N. Y.

**SOUTHERN LAMINATING CO.**  
1601 Clancy (Box 115), Memphis,  
Tenn.—Phone: WH 2-4631

**SOUTHERN PLYWOODS, INC.**  
Box 448, Greenville, Fla.  
—Phone: 2311

**SPICEDWOOD CORP.**  
Mellen, Wis.—Phone: 4-2531

**UNITED STATES PLYWOOD CORP.**  
P.O. Box 524, Orangeburg, S.C.  
(Home office: 55 W. 44th St., New York City)

**VALDOSTA PLYWOODS, INC.**  
Box 136, Valdosta, Ga.  
—Phone: 1808

**WEBER VENEER & PLYWOOD CO.**  
Shawano, Wis.—Phone: 1200

**WINNSBORO PLYWOOD CO.**  
Winnsboro, S.C.—Phone: 476



**HARDWOOD PLYWOOD INSTITUTE**

600 S. MICHIGAN AVENUE

CHICAGO 5, ILLINOIS

**Always Specify Hardwood Plywood Bearing This Seal**



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